NEWS REPORT

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NEWS REPORT

National Academy of Sciences National Research Council

VOLUME X *September–October 1960* NUMBER 5

The Work of the Maritime Research Advisory Committee

LOUIS H. RODDIS, JR., *Chairman*
HARRY BENFORD, *Executive Director*

IN RECENT years the Maritime Administration, Department of Commerce, has become increasingly concerned with the alarming growth in the amount of subsidy appropriations required to keep United States merchant ships operating in international competition. These subsidies are made available in order to overcome the otherwise impossible situation faced by United States shipowners who must pay building and operating costs which now run from two to four times those of competing foreign fleets. The need for such assistance has increased approximately fivefold within the last decade. This unfavorable situation is particularly distressing at this time since our country must, within the next few years, replace the bulk of its merchant fleet; these ships were built during the emergency conditions of World War II and are now obsolete because of age and intervening technological advances.

The Government has recognized that if it is to have any kind of merchant fleet available for peacetime foreign commerce or wartime shipping needs, it must either make major enlargements in its annual shipping subsidy appropriations, which now amount to approximately $260,000,000, or develop methods of operations and technologies which will narrow the gap between United States and foreign shipping costs. The latter course is generally held to be the more desirable and obviously research can play a part in accomplishing this objective. Recent reports of and for the Department of Commerce have clearly pointed this out. Also, the President's latest budget message specifically recommends that the use of our war-built ships be extended beyond the normal 20-year life span so as to allow the development of an economically superior fleet through expanded efforts in research and development.

For the past five or six years the Maritime Administration has sponsored a fluctuating level of research. Last year was typical. The research budget of $3,650,000 was less than one and one-half percent of the total budget. More serious than the limited level of the support was the lack, at that time, of an appropriate staff organization to lend centralized leadership and meaningful purpose to these research efforts. Seeking advice as to the correction of such shortcomings, the Maritime Administration asked the National Academy of Sciences–National Research Council to form a committee of experts who would study the problem in its broader aspects so as to:

1) Determine the most profitable short- and long-range research objectives of the Maritime Administration. 2) Translate these objectives into specific suggestions for research and development indicating relative importance and priorities. 3) Delineate methods by which the research and development indicated can be effectively carried out.

In response to the above request, the Academy–Research Council formed the Maritime Research Advisory Committee which brought together an objective group of senior engineers and scientists whose collective background and experience encompassed virtually every aspect of merchant shipping. The committee first met in January 1959 following two meetings of a planning group.

In order to broaden the background of the committee and to assist in its work, seven advisory panels were formed, each composed of several experts in the various related fields. All told, 55 individuals served on the committee or its panels and over 200 others were called upon for consultation and advice. The committee carried out its assignment between January 1959 and July 1960; there were 26 panel meetings and eight meetings of the central committee in that relatively brief period. The final report, "Proposed Program for Maritime Administration Research," was submitted in mid-August 1960.

The committee, in one of its earlier interim reports, advised the Maritime Administration to carry out its research program through contracts with outside organizations such as university and industrial research groups. It was recommended that the program be administered by a small but well qualified staff under a research director. These recommendations were accepted and in due time, put into effect.

In considering the objectives of Maritime Administration research, it was unanimously agreed that its principal aim should be to assist in providing a strong United States maritime industry which could compete in the world market, with a minimum of subsidy, and could provide improved domestic shipping services. It was also unanimously agreed that subsidy reduction could best be accomplished through developments leading to United States maritime industry which obtained maximum productivity through efficient use of its highly paid labor; the two developments which offered the most promise were crew size reduction through automation techniques and improved cargo handling systems.

Other important conclusions and recommendations stress the importance of systems analysis in determining the physical characteristics of ship designs, the usefulness of prototype ships in demonstrating the feasibility of advanced concepts, and the need for reductions in United States shipbuilding costs.

The report recommends an annual nonnuclear research appropriation of not less than ten to 12 million dollars for the next ten years. It advocates that about 15 percent of this amount be devoted to basic research in the maritime related areas and that private industry be strongly encouraged to make a manifold increase in its current level of support for research.

The report contains scores of additional recommendations relative to the design, construction, and operation of ships. Perhaps of more importance to the overall picture, however, are the committee's views on the need for action in such non-technological areas as regulatory requirements and labor-management relationships. The report concludes that, without major improvements in these areas, technical advancement will be made all but impossible. Even the subsidy law itself, which was intended to strengthen the merchant marine, was found to be less a cure than a crutch.

Rather surprisingly, the committee was unable to recommend large research expenditures by the Maritime Administration in two of the most popular of recent maritime developments: nuclear power and hydrofoil craft. While these new concepts have caught the public fancy, the committee felt that they offered relatively little promise of attaining the economic objectives of Maritime Administration research. The report also calls for a careful re-analysis of current Government policies which, the committee felt, placed undue emphasis on higher ship speeds.

The staff, consisting of three persons, was directed by Harry Benford who was granted a leave of absence by the University of Michigan in order to carry out this special assignment. Members of the Committee were:

Louis H. Roddis, Jr., President, Pennsylvania Electric Company, *Chairman*
Vice Admiral W. M. Callaghan, USN (Ret.) Chairman, Maritime Cargo Transportation Conference, National Academy of Sciences–National Research Council
Glen D. Camp, Professor of Operations Research, Case Institute of Technology
Vice Admiral E. L. Cochrane, USN (Ret.), Chairman, Maritime Cargo Transportation Conference, National Academy of Sciences–National Research Council
Roger H. Gilman, Director of Port Development, The Port of New York Authority
Jesse E. Hobson, Vice President, Director of Research, United Fruit Company
M. P. O'Brien, Former Dean of Engineering, University of California at Berkeley
Milton S. Plesset, Professor of Applied Mechanics, California Institute of Technology
Admiral Arthur W. Radford, USN (Ret.), Former Chairman, Joint Chiefs of Staff
C. Richards Soderberg, Former Dean of Engineering, Massachusetts Institute of Technology
Rear Admiral E. H. Thiele, USCG, Chairman, Ship Structure Committee
Commodore Edward M. Webster, USCG (Ret.) Chairman, Radio Technical Commission for Marine Services

In addition to the above, both David K. Felbeck and Rear Admiral E. G. Fullinwider, USN (Ret.), directors of other maritime related committees of the Academy–Research Council, participated in the work of the committee.

The writers and others associated with the committee are convinced that determined efforts to follow the program outlined in the final report can lead to a truly impressive renaissance of our nation's maritime vigor. We believe the committee's efforts have been extremely worthwhile and we are gratified to find that the Maritime Adminstration is vigorously moving ahead in the direction of our recommendations.

American-Soviet Inter-Academy Exchange Visits

LAWRENCE C. MITCHELL, *Professional Associate*
Office of International Relations

IT IS over a year since the signing of the agreement on exchanges of scientists between the National Academy of Sciences and the Academy of Sciences of the Soviet Union (*see* NEWS REPORT, Vol. IX, No. 4, p. 58, July-August 1959), and enough time has now elapsed to enable a report to be made on the activities which have been undertaken toward its fulfillment.

The agreement, it may be recalled, was entered into by the Academy following President Bronk's consultation in Moscow with Academician A. N. Nesmeyanov, President of the Soviet Academy, in the fall of 1958. Known informally as the Bronk-Nesmeyanov agreement, it implements the provision for an inter-Academy exchange of scientists contained in the broad intergovernmental exchange agreement of January 1958, which bears the names of Ambassadors Lacy and Zaroubin, who negotiated it. This document was hailed by the Department of State as a "significant step in the improvement of mutual understanding between the peoples of the United States and the Union of Soviet Socialist Republics." Upon the expiration of the Lacy-Zaroubin Agreement, a new two-year agreement was concluded between the two Governments on November 21, 1959, which refers to the inter-Academy program in the following terms:

The two Parties, attaching great significance to the development of scientific exchanges between both countries, will take all appropriate measures in order to achieve fulfillment of the agreement for exchanges in the field of science concluded July 9, 1959, between the Academy of Sciences of the Union of Soviet Socialist Republics and the National Academy of Sciences of the United States of America.

In article 1 the inter-Academy agreement provides for visits by 20 scientists from each country, at least half of whom shall be members of the respective Academies, "to deliver lectures and conduct seminars on various problems of science and technology as well as for the purpose of studying research work in progress" in the United States and the Soviet Union. The first scientists to travel under the terms of article 1 were the crystallographer, N. V. Belov, and the microbiologist, A. A. Imshenetskiy, who came to the United States in February and April 1960, respectively. In May, R. Courant, a mathematician, and Herman M. Kalckar, a biochemist, inaugurated the series of American visits to the Soviet Union. In the same month, Soviet scientists Yu. A. Kosygin, a geologist, and I. V. Tananayev, an inorganic chemist, were received in this country.

In September three more Americans went to the Soviet Union—John Bardeen, a physicist; J. L. Doob, a mathematician; and Dirk Brouwer, an astronomer. Other Americans are expected to make such visits during the forthcoming months in the fields of microbiology, psychology, mathematics, oceanography, and engineering. Scientists from the Soviet Union are expected to visit the United States this fall in the following fields of specialization: strength of materials, organic chemistry, inorganic chemistry, the physics of acoustics, and biology. Thus, it will be seen, that of the 20 visits provided for under article 1 of the agreement, 12 American scientists have already gone to the Soviet Union or are expected to go, and 9 Soviet scientists have come to the United States or have been scheduled to come in the near future.

Article 2 of the inter-Academy agreement provides for one-month visits by 18 scientists from each country specializing in 14 different fields so that they may "acquaint themselves with research conducted in the United States and the Soviet Union." Thus far, one American, Thomas Francis, Jr., a specialist on influenza, has gone to the Soviet Union, and six others are being invited to visit in the coming months. The first Soviet scientists to arrive in the United States under this article were V. V. Vitkevich, a radioastronomer who came in April, and M. M. Shemyakin, an organic chemist who came in May. The Soviet Academy has also named the following scientists as exchange visitors this fall: S. V. Serensen, a metallurgist; K. T. Poroshin, an organic chemist; and A. S. Khokhlov and G. K. Skryabin, both of whom specialize in antibiotics. Thus, seven American and six Soviet scientists either have participated in this category of the exchange already or have been named to do so.

Article 3 provides for five- or six-month visits "for conducting scientific research and for specialization," the only long-term visits to be made within the exchange program. The agreement provides for six scientists from each country. To date the names of two Soviet scientists have been sent to the National Academy: M. I. Gromov, a metallurgist due to arrive in October; and A. A. Akhrem, a stereochemist due to arrive in November. The National Academy has invited Elliot S. Valenstein, a psychologist working on conditioned reflexes, to go to the Soviet Union in 1961. Thus the Soviet Academy has named two scientists for long-term visits and our Academy has named one.

In the area of reciprocal attendance at conferences provided for in article 6, the National Academy in January extended invitations, on behalf of private American professional organizations, to 24 meetings in 1960. The comparable invitation list from the Soviet Academy consisted of nine meetings, of which only two seemed appropriate to the terms of this article. American scientists did, in fact, attend those two meetings on the basis of invitations which they received independently of the inter-Academy agreement. They were the First International Congress of the International Federation of Automatic Control, Moscow, June 27–July 2, and the International Symposium on Nuclear Photography, July 10–20. Of the 24 American conferences to which Soviet scientists were invited, only two were actually attended by them: the Symposium

on Plasticity at Brown University in May, and the meeting of the Electrochemical Society at Chicago in May.

According to article 7, both Academies "agree on the desirability of conducting, in the Soviet Union and the United States, joint symposia on current scientific problems in specialized fields." The National Academy took the initiative by proposing to the Soviet Academy that such a symposium be held in the United States in the field of radioastronomy, and the Soviet Academy agreed in principle. At the request of President Bronk, Otto Struve, Director of the National Radio Astronomy Observatory, generously consented to head a group of American scientists who would develop plans for the joint symposium. Details were subsequently forwarded to the Soviet Academy for final consideration, including the suggestion that the joint symposium be held at Green Bank, W. Va., and Washington, D. C., next February. No proposal for a symposium to be held in the Soviet Union has yet been received from the Soviet Academy.

Article 8 contains a general proposal for exchange of scientific literature, but this has not been specifically pursued; neither has a proposal for implementing this provision been received from the Soviet Academy.

At the request of President Bronk, H. P. Robertson, the Foreign Secretary of the Academy, has overseen the general implementation of the inter-Academy agreement. The day-to-day activities have been handled by Wallace W. Atwood, Jr., and his staff in the Office of International Relations (OIR). The Office has received guidance from both President Bronk and Dr. Robertson, as well as from members of the Academy, the divisions of the Research Council, and other American scientists to whom it has turned with particular problems and from whom it has always received wholehearted assistance and cooperation. The Academy is grateful to the American scientists who have cooperated in carrying out this exchange program by giving generously of their time and hospitality, and to the National Science Foundation for providing the financial support required to carry out the program.

The Office seeks to be of all possible assistance to the American scientists invited to participate in this exchange program. To this end, it provides them with a variety of information, ranging from every-day affairs that one needs to know on first visiting the Soviet Union to specialized professional information on the visitor's field of interest. In addition, the OIR is at the disposal of these American scientists for any special problems or questions that may arise in connection with their visits.

One outgrowth of the Academy's exchange program is the accumulation of files on visits made to the Soviet Union in recent years by American scientists. In the past few years American and Soviet citizens have been traveling to the other's country in constantly increasing numbers. The overwhelming majority of the visits made by American scientists have been first visits. Therefore, it seemed desirable that subsequent visitors should know of their American colleagues who had already visited Soviet scientists and institutions in order to benefit from their experiences. With this thought in mind, several years ago the OIR began to build up files of these visits. The fruits of this effort are available generally to the American scientific community.

As a by-product of handling the implementation of the inter-Academy agreement, the OIR has often found itself in the happy position of being able to offer useful advice and assistance to American universities and other institutions wishing to send scientists to the Soviet Union or to receive Soviet scientists in this country. In view of the requirement of the Soviet Government and of our own that professional visits between the two countries be made on the basis of reciprocity, the OIR, with the information that it receives from American scientific institutions, has at times been able to introduce a potential sending institution to a potential receiving institution. For example, the University of California at Berkeley was interested in inviting the Soviet astronomer, A. A. Boyarchuk, to visit for a period of several months, but was not interested at that time in sending any of its astronomers to the Soviet Union in return. However, the OIR knew that the High Altitude Observatory wished to send one of its young researchers, Harold Zirin, to the Crimean

Astrophysical Observatory. Although the High Altitude Observatory would have liked to receive a Soviet astronomer for a visit in return, it was able to come to an agreement with the University of California whereby Boyarchuk could come to Berkeley in exchange for Zirin's visit to the Soviet Union. This exchange was finally worked out formally between the Department of State, acting on behalf of the University of California and the High Altitude Observatory, and the Soviet Government. It is particularly gratifying to the OIR to be able to share its knowledge in these matters with interested American scientists concerned and thereby to make it useful to them.

As may be inferred from the foregoing description of the OIR's activities in the field of American-Soviet scientific exchanges, the Office maintains relations with other organizations active in the field, particularly the Soviet and Eastern European Exchanges Staff in the Department of State, as well as other governmental and private groups. In connection with the exchange of pre- and postdoctoral scholars under the intergovernmental exchange agreement, the OIR has been able to provide assistance to those American participants who are scientists.

The actual commencement of visits under the inter-Academy agreement was understandably slow. Certain of the visits require a lead time of 3 months, and the participants from both countries must fit their visits into otherwise busy schedules. Thus, it is noticeable that the pace of these visits has increased after a slow beginning. Even so, it is not clear at this writing whether it will be possible for either Academy to accomplish all of the projects envisaged by the agreement within the two-year period, although every effort will be made by the Academy to do so.

The inter-Academy exchange agreement is unusual for the National Academy of Sciences. It was entered into in the belief that exchanges were desirable and in the hope that increased contacts between American and Soviet scientists, made possible through a formal exchange agreement, would hasten the day when scientists of both countries could visit each other at will, as is customary in the international scientific community.

SCIENCE NEWS

FOREIGN FIELD RESEARCH PROGRAM

The Foreign Field Research Program, designed to assist young scientists who wish to undertake field research abroad on a topic of geographical significance, is entering its sixth year and shows every indication that it will continue indefinitely as long as the high calibre of applicants and reports is maintained.

As emphasis is placed on physical geography, the Division of Earth Sciences, which is administering the program, and the Office of Naval Research, which is supplying the funds, encourages studies in such fields as shore processes, coastal development, stratigraphy and sedimentation of unconsolidated formations, landforms and drainage, mineral economics, and many aspects of pedology, glaciology, palynology, and climatology.

To date, 45 persons have been accepted for support from among 140 applicants representing about 40 American colleges and universities. The proposed time in the field has ranged from 3 to 24 months, with 12 months as the average time spent overseas. The size of accepted proposals has ranged between $900.00 and $10,960.00 depending on the location and duration of the study.

Eight reports have been published and three are presently being processed for publication. Information concerning application for grants or availability of published reports may be obtained from the Division of Earth Sciences.

PACIFIC SCIENCE CONGRESS

The National Academy of Sciences, Bernice Pauahi Bishop Museum, and the University of Hawaii are hosts to the 10th Pacific Science Congress to be held at the University from August 21 to September 6, 1961.

The sponsoring organization for these Congresses is the Pacific Science Association, an international and non-governmental organization, whose membership includes 47 Pacific rim countries and other countries with interests in the Pacific. Member countries are represented through their principal scientific organization.

The scientific program includes 124 symposia in the Sections on Agricultural Sciences, Biological Sciences, Conservation, Forestry, Geography, Geophysical Sciences, Public Health and Medical Sciences, and Scientific Information. The program will also include sessions for contributed papers and reports of Standing Committees of the Pacific Science Association. Special symposia will include "Man's Place in the Island Ecosystem," which is being sponsored by Unesco, "The Galapagos Islands," and "Science Museums in the Pacific Area." Approximately 1,000 United States and foreign scientists have been invited to present papers.

Other features of the Congress will include exhibits, visits of research vessels, and a program of science films. An exhibit showing the United States participation in the history of geographical exploration and of surveying and mapping of the Pacific basin during the period 1783-1899 is being arranged by The National Archives.

Countries operating marine research vessels in the Pacific have been invited to schedule one or more of their vessels into Honolulu at the time of the Congress. Whenever possible, arrangements will be made for visits to the vessels by participants at the Congress in order that they may view the specialized equipment aboard and discuss the research programs.

Inquiries about the Congress should be addressed to Harold J. Coolidge, Secretary-General, 10th Pacific Science Congress, Bishop Museum, Honolulu 17, Hawaii.

AWARDS IN RADIOLOGICAL RESEARCH

The National Academy of Sciences–National Research Council, on behalf of the James Picker Foundation, is accepting applications for fellowships and grants in the field of radiology and nuclear medicine for the year 1961-1962. Awards are made in four categories:

The Advanced Fellowships in Academic Radiology, offered for the first time during 1960-1961, reflect the increased interest of the James Picker Foundation in the development of personnel for academic radiology. The purpose of this new award is to prepare the candidate to meet the intellectual demands of an academic position in radiology. Emphasis is placed upon the acquisition of a broad background in the basic sciences related to radiology.

Postdoctoral Fellowships in Radiological Research are open to recent graduates who desire experience and training in scientific investigation. While persons from closely related disciplines are eligible to apply, candidates with some training in the field of radiology will receive preference.

Grants for Scholars are a transitional form of support, designed to bridge the gap between the completion of research fellowship training and the period when the young scientist has thoroughly demonstrated his competence as an independent investigator.

Grants-in-Aid of Research are designed to encourage investigations offering promise of improvement in radiological methods of diagnosis or treatment of disease. Research grants are awarded to institutions, rather than to individuals.

Applications in these four categories will be reviewed by the Committee on Radiology of the Academy–Research Council's Division of Medical Sciences. Final determination of awards is made by the Foundation upon recommendation of the Division. Support is not restricted to citizens of the United States or to laboratories within this country.

BUILDING RESEARCH INSTITUTE PROGRAM FOR FALL CONFERENCES

The Building Research Institute will hold its 1960 Fall Conference in Washington, D.C., November 15-17, featuring a research correlation conference on "Preassembled Components" in modern building. Under the chairmanship of Leon Chatelain, Jr., FAIA, Chatelain, Gauger and Nolan, the three-day session will also include a conference on "Structural Foams," a conference-workshop on "Fasteners and Anchorage

Devices for Industrial Curtain Walls," and a conference on Building Research developed by the Institute's Research Committee.

The program on preassembled components, which has been under development for the past year by the BRI Plastics Study Group, will first examine the attitudes toward this method of construction held by architects, home builders, general and specialty contractors, building owners and operators, organized and unorganized labor, and building code officials. A spokesman for each of these groups will present the views of his colleagues, their problems and successes with the use of components, and their suggestions for further improvement of methods, materials, and practices. Chairman of the conference will be Robert T. Holtz, product engineer, B. F. Goodrich Chemical Company.

The second section of the program will deal with the principles of design and assembly of components for both residential and nonresidential construction, for prefabricated, and site constructed houses. Experience and cost data developed in production, distribution, and construction by building material dealers will be reported. A review of manufacturers' experiences in combining materials to form preassembled components and the optimum level of preassembly of components for the most favorable manufacturing and distribution costs will also be reported.

The two-day session will include a series of case study reports on actual use of preassembled structural components, including window and door components, wall and partition systems, and a special group of case studies on preassembled mechanical components, electrical systems, and utility cores.

The conference on "Structural Foams," on Wednesday, November 16 will include a session on foamed inorganic materials, including glass, concrete, and metals, followed by a session on foamed organic materials such as the polyurethanes and polystyrenes in their application to thin shell construction. Chairman for the program on structural foams will be Thomas E. Werkema, Industrial Research Analyst, Dow Chemical Company.

The BRI Research Committee, under the chairmanship of Peter B. Gordon, Vice President, Wolff and Munier, Inc., will again present a group of the proposals for new building research projects by colleges, universities, and private research laboratories which have excited so much interest at the last two BRI semi-annual conferences. In addition, the Committee has been soliciting and screening reports from research workers on new research under way or recently completed. This is the first time that research people have had the opportunity at a BRI conference to describe their own research projects outside the scope of the comprehensive conferences, and open them to discussion and criticism by an audience.

"Fasteners for Industrial Curtain Walls" will be a conference-workshop type of program, with specialists participating in a closed workshop for a day and a half, and the balance of the second day thrown into an open meeting at which their conclusions will be reported. The session will be under the chairmanship of William Wyckoff, Assistant Sales Manager, Townsend Company, who is chairman of the BRI Planning Committee on Mechanical Fasteners in Building.

Open to the interested public as well as to BRI members and guests, the three-day meeting is the third in the newly inaugurated series of BRI semi-annual, multi-subject conferences. The Institute is a unit of the Division of Engineering and Industrial Research.

CONFERENCE ON THE BIOLOGICAL ASPECTS OF METAL BINDING

The Division of Medical Sciences held an ad hoc Conference on the Biological Aspects of Metal Binding with the support of the National Institutes of Health and the Atomic Energy Commission September 6-9 at the Pennsylvania State University. The program committee, under the chairmanship of A. Baird Hastings of the Scripps Clinic at La Jolla, California, brought together more than 100 scientists from various disciplines to consider not only the present applications of metal binding agents but also how these agents could be made more effective.

The session on the chemistry of metals and metal-binding agents organized by Arthur Martell of Clark University was opened by R. J. R. Williams of Oxford University who introduced the biologists in the audience to the concepts of electron spin, d-orbitals, nuclear magnetic resonance, and crystal field theory.

The section on physiological aspects of metals was organized by George C. Cotzias of the Brookhaven National Laboratory and outlined the dependence of the metabolism of the essential metals on their physical and chemical properties. Bo Malmstrom of the University of Uppsala, Sweden, demonstrated the application of physical methods to the elucidation of the function of zinc in enzymic reactions.

The section on the pharmacology and toxicology of chelate agents organized by Maynard Chenoweth of the Dow Chemical Company brought out the known and suspected roles of metal binding in drug actions, particularly those of antibiotics, and the problems in testing chelate agents as food additives or drugs. Adrien Albert of the National University at Canberra, Australia, emphasized the role which chelate agents can play in the transport of metals across cell membranes in considering the design of chelate agents for selected biological activity.

The section on application of chelate agents in medicine, which was organized by Harry Foreman of the Los Alamos Scientific Laboratory in New Mexico, gave particular attention to treatment of poisoning by heavy or radioactive metals, the latter subject being discussed in detail by Alexander Catsch of the Institute of Radiobiology of Karlsruhe, Germany.

Melvin Calvin of the University of California at Berkeley summarized the Conference by pointing to some of the key problems requiring further investigation and recognizing the stimulus of findings in one discipline to new investigations in another. He encouraged increased collaboration and interdisciplinary approach to the solution of problems in the future.

The proceedings of the Conference are to be published as a supplement to Federation Proceedings.

INTERNATIONAL STATISTICAL INSTITUTE

The 32nd Session of the International Statistical Institute (ISI) was held in Tokyo, Japan, May 30 to June 9, under the auspices of the Japanese Government. The Session also marked the 75th Anniversary of the founding of the ISI.

More than 300 statisticians from 44 countries attended the Session. Delegates were sent by 11 United Nations agencies and other international bodies. Thirty-five countries designated government delegations to the Session. Other countries had delegations appointed by national societies and institutions. The United States delegation was designated by the National Academy of Sciences–National Research Council and consisted of the following eight members:

S. S. Wilks, Princeton University, *Chairman*
R. C. Bose, University of North Carolina
W. G. Cochran, Harvard University
Gertrude M. Cox, Research Triangle Institute
Jerzy Newman, University of California (Berkeley)
Frank Notestein, Population Research Council
W. Y. Youden, National Bureau of Standards

The Session was organized by a committee of Japanese statisticians under the chairmanship of Shuji Masutani, Director-General of the Administrative Management Agency of the Government of Japan. The Session was organized into 25 meetings at which 172 papers were presented, 35 of them by title. The Organizing Committee made these papers available in page proof to all participants upon registration, with the expectation that the Proceedings of the Session would be issued in the Fall of 1960. There were one or more meetings in each of the following areas: design of experiments; economic growth and capital formation; evaluation of census and sample surveys; industrial statistics; information theory; interval estimation theory; inventory control; macro-economic entities; maximum likelihood estimation; measurement of errors; measurement of the labor force; multivariate statistical analysis; population dynamics; statistical decision functions; statistical methodology in biology; in insurance; in market research; in medical research; and stochastic processes in the physical sciences. There were also several

meetings devoted to miscellaneous contributed papers in economic statistics and in mathematical statistics.

The extent of United States participation is indicated by the fact that 59 American statisticians attended the Session, and presented 37 papers.

The three sessions of the General Assembly of the ISI were devoted mainly to discussions of reports of activities of the ISI and its committees since the 31st Session in Brussels in September 1958, and of future activities. The following were elected members of the Bureau of the ISI to serve until the 33rd Session to be held in Paris in September, 1961:

M. Boldrini, Italy, *President*
C. E. Dieulefait, Argentina, *Vice-President*
G. Fürst, Federal Republic of Germany, *Vice-President*
Y. Morita, Japan, *Vice-President*
H. O. A. Wold, Sweden, *Vice-President*
G. Goudswaard, Netherlands, *Secretary-General*
Gertrude M. Cox, United States, *Treasurer*

ADVISORY COMMITTEE ON BASIC RESEARCH

The responsibility to evaluate the scientific merits of basic research proposals received by the Office of Ordnance Research (OOR), Department of the Army, has been given to an advisory committee appointed for that purpose by the Academy–Research Council. To provide an intimate acquaintance with the status of research in the diversified subfields of each of the divisions represented (chemistry, engineering, mathematics, and physics) would require an extremely large committee. As an alternative in attaining this objective, the Committee asks, in the case of each proposal, for the advice of three or more referees who have knowledge of the special field of that proposal. The reports from these referees are used by the Committeemen as a basis for preparing their evaluations for the OOR. With a revolving Committee new referees are constantly being assigned and therefore no one specialist is called upon to appraise any large number of proposals.

R. E. Gibson, National Academy of Sciences–National Research Council, is serving as chairman of the Committee.

The members of the Committee are appointed by the President of the Academy–Research Council for a three-year term. The following list shows the present membership of the Advisory Committee and the subfields represented arranged by Division:

Division of Chemistry and Chemical Technology

John H. Yoe, University of Virginia, Analytical chemistry
E. F. Osborn, Pennsylvania State University, Ceramic sciences
John D. Ferry, University of Wisconsin, High polymers
John Margrave, University of Wisconsin, Inorganic chemistry
Harold Snyder, University of Illinois, Organic chemistry
G. W. Wheland, University of Chicago, Organic chemistry
Henry S. Frank, University of Pittsburgh, Physical chemistry
Richard M. Noyes, University of Oregon, Physical chemistry

Division of Engineering and Industrial Research

Samuel Seely, Case Institute of Technology, Electrical engineering and acoustics
Antonio Ferri, Polytechnic Institute of Brooklyn, Fluid dynamics
Ernest F. Brater, University of Michigan, Fluid mechanics
Edward A. Saibel, Rensselaer Polytechnic Institute, Friction lubrication
Renato Contini, New York University, Human engineering
William R. Osgood, The Catholic University of America, Mechanics
Thomas A. Read, University of Illinois, Materials
Ernest P. Eckert, University of Minnesota, Thermodynamics and heat transfer
Paul A. Beck, University of Illinois, Physical metallurgy
A. M. Gaudin, Massachusetts Institute of Technology, Process metallurgy

Division of Mathematics

Nathan Jacobson, Yale University, Algebra, Theory of numbers and foundations
L. H. Loomis, Harvard University, Analysis (Abstract)
Charles B. Morrey, University of California (Berkeley), Analysis (Classical)
G. E. Forsythe, Stanford University, Applied mathematics and numerical analysis
Robert M. Thrall, University of Michigan, Operations research
William G. Cochran, Harvard University, Statistics and probability
Paul Olum, Cornell University, Topology and geometry

Division of Physical Sciences

ROBERT G. PARR, Carnegie Institute of Technology, Atomic and molecular physics
HARDIN M. MCCONNELL, California Institute of Technology, Chemical physics
W. P. ALLIS, Massachusetts Institute of Technology, Gaseous electronic phenomena
C. K. JEN, The Johns Hopkins University, Microwaves
ROBERT K. ADAIR, Brookhaven National Laboratory, Nuclear physics
ALBERT WATTENBERG, University of Illinois, Nuclear physics
DEANE B. JUDD, National Bureau of Standards, Optics and other miscellaneous fields
MALCOLM H. HEBB, General Electric Research Laboratory, Solid state physics
ROBERT J. MAURER, University of Illinois, Solid state physics

INTERNATIONAL GEOLOGICAL CONGRESS

The 21st International Geological Congress met in Copenhagen August 15 to 25, 1960. The meetings were preceded and followed by field excursions in Denmark, Finland, Iceland, Norway, and Sweden, the five Nordic countries who were hosts for the Congress.

The meeting was attended by some 3,000 geologists and related scientists from 94 countries. Approximately 500 technical papers were presented. Seven permanent Commissions of the Congress held concurrent sessions.

The United States was represented by 145 delegates from various universities, institutes, geological surveys, and other professional organizations. The following United States delegation was appointed by the Department of the Interior and the National Academy of Sciences–National Research Council:

THOMAS B. NOLAN, Director, U. S. Geological Survey, *Chairman*
M. J. ANKENY, U. S. Bureau of Mines
KENNETH CASTER, President, Paleontological Society
J. L. GILLSON, President, American Institute of Mining, Metallurgical, and Petroleum Engineers
JAMES GILLULY, National Academy of Sciences
H. D. HEDBERG, President, Geological Society of America
W. D. JOHNSTON, JR., U. S. Geological Survey
JOSEPH MURDOCK, President, Mineralogical Society of America
B. H. PARKER, President, American Association of Petroleum Geologists
J. F. SCHAIRER, President, Geochemical Society

COMMITTEE ON ATMOSPHERIC SCIENCES

The Committee on Atmospheric Sciences of the National Academy of Sciences–National Research Council, in its report, "Meteorology on the Move," notes a number of recent undertakings by government and academic institutions in response to previous Committee recommendations. These undertakings include a first step toward a National Center for Atmospheric Research. The report points out that still further steps are urgently required.

The report underscores the striking success of the weather satellite TIROS I, man's first instrument for the continuing observation of large-scale weather phenomena. Analysis of world-wide meteorological information obtained at regular, short intervals may greatly increase our understanding of the basic principles of meteorology as well as the precision of forecasting. This increased understanding will some day provide the answer to the question whether small- or large-scale weather control is possible.

The report emphasizes that there exists at the moment no organization or group in the world prepared to fully exploit the new wealth of information that meteorological satellites will certainly provide. The huge expenditure of scientific effort, engineering, and finances in meteorological satellites may be largely wasted unless a proper organization is ready to exploit the vast amount of informational output of the meteorological satellites.

Much of the report concerns the Committee's hopes for the National Center for Atmospheric Research, now being organized by a group of 14 universities under a grant from the National Science Foundation. The Committee considers the proposed National Center for Atmospheric Research to be an indispensable additional facility. The recommendation to create a National Center, the Committee emphasizes, should in no way be misconstrued as a limitation on the Weather Bureau's research program. On the contrary, the Committee urges that the research programs of the Center and the Weather Bureau should evolve at a maximum rate for an orderly development of staff, research objectives,

and facilities. The Committee recognizes that the increasing natural demands for applied and basic research are today so great that a maximum degree of cooperation and coordination in scientific activities and responsibilities is required.

The Committee envisions the National Center as a laboratory in which permanent staff scientists, as well as visiting scientists, will contribute to a group of related, basic problems pertinent to the atmospheric sciences. The interdisciplinary nature of the problems to be studied at the proposed Center will give promise of greater progress.

In further support of its recommendations the Committee reviewed other dramatic new developments that have excited workers in this field. Among these are balloon and rocket soundings above the poles, tracking of radioactive debris in the stratosphere, radio observations of ionospheric irregularities, correlation of density fluctuations (inferred from air drag effects on satellites) with solar flares and geomagnetic activity, satellite measurement of solar and infrared radiation, and the new developments in mathematical and experimental models for numerical weather prediction.

The Committee notes that it is imperative that the knowledge of new materials and devices, new experimental methods, concepts, and techniques, and an uninhibited and daring experimental attitude be directed to catalyze our capabilities for advancement in the atmospheric sciences.

CONFERENCE ON PROTEIN NEEDS

An international conference designed to consolidate information and research on protein food sources in countries with protein deficits was held August 21-24 under the auspices of the Committee on Protein Malnutrition of the Food and Nutrition Board and the Nutrition Study Section of the National Institutes of Health. Thirty-three participants from 18 foreign countries joined with 42 from the United States in a program with 48 scheduled reports and discussions.

The Committee on Protein Malnutrition of the Food and Nutrition Board was created to organize and supervise a worldwide research program on high protein foods for the improvement of the nutrition of populations, particularly of growing children, in food deficient countries. The work of the Committee has been supported by a grant of $550,000 from the Rockefeller Foundation. An important factor in the progress of the Committee's program has been an allocation of $300,000 by the Executive Board of UNICEF for laboratory tests, process development, and support of acceptability trials of protein rich foods.

The great progress made in research on protein foods as a result of the work supported by the Committee in many different parts of the world has made it desirable to have this conference for the purpose of reviewing the present state of our knowledge, exchanging information and ideas between research workers, surveying the areas of greatest promise for future work and planning new research activities, and the practical use of present knowledge.

The results reported at this conference demonstrated forcefully that food protein sources previously considered unsuitable for human food, particularly for infants and children, were rapidly being developed into acceptable products from indigenous foods such as cottonseed, peanuts, sesame, coconut, and soybeans. Successful introduction of vegetable protein mixtures has already been accomplished in several countries. The basic research stimulated by the grants of the Committee has accomplished much but the biggest problem remaining is that of developing the processing technology and specifications that will produce products of dependable quality for commercial distribution at costs within the means of the most needy.

The conference focused the spotlight on the greatest of human nutrition problems, namely, the provision of satisfactory nutrition for the millions of infants in protein-deficit countries who fail to survive the post-weaning period of adaptation to an adult type of diet. It was emphasized that in countries where milk is unavailable and no promise for a supply exists, the new protein mixtures may become a boon to the populations.

The Proceedings of the Conference will be published by the Academy–Research Council.

FIFTH INTERNATIONAL CONGRESS ON NUTRITION

Research scientists in the field of nutrition from 59 countries presented initial reports of their recent investigative work at the Fifth International Congress on Nutrition in Washington, D. C., September 1–7.

The Congress was arranged under the auspices of the International Union of Nutritional Sciences, the American Institute of Nutrition, and the United States National Committee of the International Union of Nutritional Sciences of the National Academy of Sciences–National Research Council. Several agencies of the United States Government, as well as American foundations, institutions, and interested segments of industry provided financial support for the Congress, thus making possible for the first time in the western world the presentation of the latest news on current nutrition research.

There were seven half-day panel discussions led by 50 invited scientists from 20 foreign countries and the United States. There were also 37 special sessions at which 370 ten-minute papers reported unpublished results of original research presented by approximately 500 investigators from almost every country in the world. W. Henry Sebrell, Jr., of Columbia University was chairman of the program committee.

The organizing committee for the Congress, under the chairmanship of Paul György, professor of pediatrics at the University of Pennsylvania, co-operated with American universities and research centers, which offered lectureship appointments to many of the scientists from abroad attending the Congress. Travel grants also facilitated the attendance of leading nutrition scientists of the world who presented papers on the program. William J. Darby of Vanderbilt University was chairman of the lectureship and fellowship committee.

C. Glen King, Executive Director of The Nutrition Foundation, Inc., was President of the Congress. Dr. King felt that the program gave emphasis to major areas of nutrition research and to practical aspects of meeting human needs throughout the world. Binay R. Sen, Director General of the Food and Agriculture Organization of the United Nations, explained its Freedom-from-Hunger campaign. Details of the Food-for-Peace program of the United States Department of Agriculture in cooperation with the Department of State was presented by representatives of the United States Government.

A luncheon was held at the National Academy of Sciences on September 2 in honor of the official delegates to the General Assembly of the International Union of Nutritional Sciences. Vincent du Vigneaud was host on this occasion in the absence of Detlev W. Bronk, President of the Academy.

The scientific sessions closed on September 6 with an all-day symposium, World Food Needs and Food Resources, followed by an all-Congress banquet.

STAFF APPOINTMENTS

William J. Harris, Jr., who has been serving as Executive Director of the Materials Advisory Board, one of the units of the Division of Engineering and Industrial Research, now comes to the Division office as Assistant Executive Secretary for Planning. Dr. Harris completed his graduate training at the Massachusetts Institute of Technology.

Robert Crozier will replace Dr. Harris as Executive Director of the Materials Advisory Board. Mr. Crozier has been associated for the past 26 years in various technical, engineering, production, and marketing capacities with Union Carbide Metals Company.

Brig. Gen. Stuart M. Charlesworth, U.S.M.C.(ret.), formerly Assistant Executive Secretary of the Division of Engineering and Industrial Research has been designated Assistant Executive Secretary for Operations. His specific responsibilities will be the planning and execution of administrative management functions of the Division office and of the committees, boards, and conferences administered by the Division of Engineering and Industrial Research.

John H. Costinett, Jr., joined the Building Research Institute staff in the capacity

of Associate Staff Engineer and will work with Harold Horowitz, Assistant Director for Technical Programs, on the establishment of a new service devoted to abstracting and indexing unpublished academic research on building in addition to other duties. His most recent post has been with the General Services Administration as materials engineer, and prior to that he was chief of the District of Columbia engineering laboratory of the Corps of Engineers.

Dwight Chapman, Chairman of the Department of Psychology, Vassar College, joined the staff of the Disaster Research Group for a seven-month period on leave of absence from Vassar College. His principal duties during this time will be to assist the Technical Director in the editing of several papers which have been in preparation during the past year. These are intended to provide a comprehensive survey of research on human behavior in disaster.

The Division of Medical Sciences has announced the appointment of **Henry T. Gannon,** as a Professional Associate. His duties will relate to the Division's interests in the National Blood Program and to certain other activities in the medical field. Dr. Gannon received his M.D. degree from St. Louis University in 1938. He recently retired from the U. S. Navy Medical Corps after more than 20 years' active service. His last assignment was in the office of the Assistant Secretary of Defense for Health and Medical Affairs, where he was responsible for mobilization planning and for the military blood program.

Gilbert W. Beebe returned in September from a two-year tour as Chief of Biostatistics in the Atomic Bomb Casualty Commission, Hiroshima, Japan, to resume his duties as head of the Follow-up Agency in the Division of Medical Sciences. Dr. Beebe has been succeeded at ABCC by **Seymour Jablon,** who had been in charge of the Follow-up Agency during his absence, and who will also serve for two years in Japan.

RECORD OF MEETINGS

July		July	
1	Committee for Study of Safety in School Fires	13	Committee on International Exchange of Persons
6	Geophysics Research Board		Food Protection Committee, Subcommittee on Toxicology
	Committee on Hamster Standards, Institute of Laboratory Animal Resources	14–15	Committee on Composite Pavement Design, *Columbus, Ohio*
7	Committee on Textile Functional Finishing, *Natick, Mass.*	18	Federal Construction Council, Task Group 35 on Piling
	Armed Forces–National Research Council Committee on Vision, Working Group 16 on Visual Perception of Three Dimensional Space	19	Advisory Committee on Survey of Apparatus for Science Teaching
	Delegation to the Rio Conference of the United States National Committee for Federation Internationale de Documentation	20	Federal Construction Council, Task Group on Test Procedures for Underground Heat Distribution Systems
8	Study Group on Ruptured Intervertebral Disc	21	Federal Construction Council, Task Group on Criteria for the Acceptance of Cast Iron Soil Pipe
12	Committee on Pest Control and Wildlife Relationships		Armed Forces–National Research Council Committee on Vision, Working Group 6 on Visual Displays

July	
25	Committee on Nutritional Studies, *Elgin, Illinois*
25–29	Armed Forces–National Research Council Committee on Vision, Working Group 6 on Visual Displays
26	Committee on the Study of Economic Factors Affecting Graduate Student Careers
27	Institute of Laboratory Animal Resources, Executive Committee Ad hoc Committee on the Role of Patents in Research Committee on the Study of Economic Factors Affecting Graduate Student Careers
August	
4–5	Department of Traffic and Operations, *Chicago, Ill.*
9	Advisory Board on Quartermaster Research and Development, *Chicago, Ill.*
9–10	Meeting of Bituminous Division of the Department of Materials and Construction, *Lafayette, Ind.*
10–11	Armed Forces–National Research Council Committee on Bio-Astronautics, Executive Council
11	Agriculture Research Institute, Membership Committee
12	Panel on Engineering in Developing Countries
15	Committee on Blood and Related Problems Committee on Pest Control and Wildlife Relationships, Subcommittee on Problem Inventory
16	Subcommittee on Pest Control Manual

August	
18–19	Meeting of Department of Economics, Finance and Administration of the Highway Research Board
21–24	Conference on Protein Needs of the Committee on Protein Malnutrition
24	Committee on International Exchange of Persons
24–25	Committee on Infant Nutrition Committee on Amino Acids
29–30	Review subcommittee of the Committee on Compaction of Embankments, Subgrades, and Bases Working Group for Consideration of Sensory and Perceptual Problems in Space Flight of the Panel on Psychology, Armed Forces–NRC Committee on Bio-Astronautics, *Woods Hole, Mass.* Working Group on Training of Astronauts of the Panel on Psychology, Armed Forces–NRC Committee on Bio-Astronautics, *Woods Hole, Mass.*
29–Sept. 2	Panel on Acceleration Stress, Armed Forces–NRC Committee on Bio-Astronautics, *Woods Hole, Mass.*
30	Ad hoc Subcommittee on Public Information of Food Protection Committee
31	Project Advisory Committee for SR-152 Operating Committee of the Federal Construction Council
31–Sept. 2	Panel on Closed Ecological Systems, Armed Forces–NRC Committee on Bio-Astronautics Panel on Psychology, Armed Forces–NRC Committee on Bio-Astronautics, *Woods Hole, Mass.*

NEW PUBLICATIONS

American Geological Institute. *Mineral, Fossil and Rock Exhibits and Where to See Them; an Annotated Listing of Public Museums in the United States and Canada with Significant Geological Exhibits.* Washington, 1960. 61 p.

Appelman, Evan H. *The Radiochemistry of Astatine.* Washington, NAS–NRC, Committee on Nuclear Science, Subcommittee on Radiochemistry, 1960. (Nuclear Science Series; Report No. [30-12] 29 p. $0.50. (Available from: Office of Technical Services, Dept. of Commerce, Washington 25, D.C.)

Conference Board of Associated Research Councils. Committee on International Exchange of Persons. *United States Government Awards under the Fulbright and Smith–Mundt Acts. Program Announcements: University Lecturing, Advanced Research, 1961–1962, Europe, the Near East, the Far East, Africa.* Washington, 1960. 104 p. Conference on Electrical Insulation. *Annual Report, 1959.* Washington, 1960. (NAS–NRC Publication 756.) 153 p. $4.00.

Federal Construction Council. Task Group T-38 on Refrigerated Storage Installations. *Refrigerated Storage Installations . . .* Washington, 1960. (NAS–NRC Publication 759. Federal Construction Council, Technical Report No. 38.) 74 p. $2.00.

Hertig, Arthur T., and Gore, Hazel. *Tumors of the Female Sex Organs. Part 2, Tumors of the Vulva, Vagina and Uterus.* Washington, Armed Forces Institute of Pathology, 1960. (*Atlas of Tumor Pathology*, Sect. IX, Fasc. 33.) 275 p., illus. $2.50. (Available from: Armed Forces Institute of Pathology, Washington 25, D.C.)

Logan, Richard F. *The Central Namib Desert, South West Africa.* Washington, 1960. (NAS–NRC Publication 758. Division of Earth Sciences, Foreign Field Research Program, Report No. 9.) 162 p., illus. $2.00.

Mosborg, Robert John. *Behavior of Riveted and Welded Crack Arrestors.* Washington, NAS–NRC, 1960. (Ship Structure Committee. Serial No. SSC-122.) 114 p., illus.

National Research Council. Building Research Institute. *Documentation of Building Science Literature.* Washington, 1960. (NAS–NRC Publication 791.) 46 p. $2.00.

National Research Council. Committee on Atmospheric Sciences. *Meteorology on the Move; a Progress Report . . .* Washington, 1960. (NAS–NRC Publication 794.) 30 p.

National Research Council. Committee on the Survey of Medical Research in the Veterans Administration. *Medical Research in the Veterans Administration, Final Report.* Washington, NAS–NRC, 1960. 131 p.

National Research Council. Division of Mathematics. *Annual Report, 1 July 1959–30 June 1960.* Washington, NAS–NRC, 1960. 31 p.

National Research Council. Highway Research Board. *Roadside Development, 1960.* Washington, 1960. (NAS–NRC Publication 774.) 25 p., illus. $1.00.

National Research Council. Highway Research Board. *Snow and Ice Control with Chemicals and Abrasives.* Washington, 1960. (NAS–NRC Publication 761. Highway Research Board Bulletin 252.) 30 p. $0.80.

National Research Council. Maritime Research Advisory Committee. *Proposed Program for Maritime Administration Research.* Washington, NAS-NRC, 1960. 2 Vols.

Pacific Science Association. *Tenth Pacific Science Congress, University of Hawaii, U.S.A., August 21 to September 6, 1961. Circular of Information.* Honolulu, Bishop Museum Press, 1960. 56 p., illus.

Steinberg, Ellis P. *The Radiochemistry of Zirconium and Hafnium.* Washington, NAS–NRC, Committee on Nuclear Science, Subcommittee on Radiochemistry, 1960. (Nuclear Science Series; Report No. [30-11]) 52 p. $0.50. (Available from: Office of Technical Services, Dept. of Commerce, Washington 25, D.C.)

Sunderman, D. N., and Townley, C. W. *The Radiochemistry of Indium.* Washington, NAS–NRC, Committee on Nuclear Science, Subcommittee on Radiochemistry, 1960. (Nuclear Science Series; Report No. [30-14]) 46 p. $0.50. (Available from: Office of Technical Services, Dept. of Commerce, Washington 25, D. C.)

Notice of Academy Meetings

NATIONAL ACADEMY OF SCIENCES

Autumn Meeting, University of Pennsylvania,
Philadelphia, Pa., November 14–16, 1960

Annual Meeting, Washington, D. C., April 24–26, 1961

NATIONAL ACADEMY OF SCIENCES–NATIONAL RESEARCH COUNCIL

Governing Board, Washington, D. C., October 9, 1960

Governing Board, Washington, D. C., December 11, 1960

Governing Board, Washington, D. C., February 12, 1961

Governing Board, Washington, D. C., April 23, 1961

Governing Board, Washington, D. C., June 11, 1961

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The search for Truth is in one way hard and in another easy. For it is evident that no one can master it fully nor miss it wholly. But each adds a little to our knowledge of Nature, and from all the facts assembled there arises a certain grandeur.

—ARISTOTLE

ANATOMY